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Development of a vulnerability index for small island developing States

Report of the Secretary-General

1. Paragraphs 113 and 114 of the Programme of Action for the Sustainable Development of Small Island Developing States (A/CONF.167/9), which was endorsed by the General Assembly in 1994 in its resolution 49/122 of 19 December 1994, call for the development of a vulnerability index (indices) for small island developing States (SIDS). Those paragraphs read as follows:

> "Small island developing States, in cooperation with national, regional and international organizations and research centres, should continue work on the development of vulnerability indices and other indicators that reflect the status of small island developing States and integrate ecological fragility and economic vulnerability. Consideration should be given to how such an index, as well as relevant studies undertaken on small island developing States by other international institutions, might be used in addition to other statistical measures as quantitative indicators of fragility.
>
> "Appropriate expertise should continue to be utilized in the development, compilation and updating of the vulnerability index. Such expertise could include scholars and representatives of international organizations that have at their disposal the data required to compile the vulnerability index. Relevant international organizations are invited to contribute to the development of the index. In addition, it is recommended that the work currently under way in the United Nations system on the elaboration of sustainable development indicators should take into account proposals on the vulnerability index."

2. By its resolution 50/116 of 20 December 1995, the General Assembly renewed its request that work begin on the index. In 1996, at its fourth session, the Commission on Sustainable Development, in decision 4/16, encouraged "the relevant bodies of the United Nations system to accord priority to the development of the index".

3. Accordingly, the Department of Economic and Social Affairs undertook initial studies in 1996, in order to provide a conceptual framework for the development of a vulnerability index. A background paper was prepared and distributed in December 1996 to small island developing

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States, organizations of the United Nations system and academic and research institutes for comments. The paper provided an analysis of the inherent vulnerabilities of small island developing States, discussed a possible approach to the vulnerability issue and suggested that consideration be given to the construction of an economic vulnerability index and an ecological vulnerability index, each composed of a number of appropriate indicators. The more than 20 responses received were all supportive of the main thrust of the background paper. The background paper was subsequently revised.[1]

4. In 1997, the Department of Economic and Social Affairs engaged two consultants,[2] one to develop an economic vulnerability index and the other to develop an ecological vulnerability index. The Department also convened an ad hoc expert group to review the technical work of the consultants and to make appropriate recommendations. The report of the expert group is contained in the annex to the present report.

5. Subsequently, Working Group III of the Committee for Development Planning met from 17 to 19 December 1997. In accordance with the work programme adopted by the Committee at its thirty-first session,[3] and the draft General Assembly resolution contained in document A/C.2/52/L.41, the Working Group reviewed the work of the ad hoc expert group on the development of a vulnerability index for small island developing States and considered the usefulness of the vulnerability index as a criterion for the designation of the least developed countries. It agreed to meet again shortly before the Committee's scheduled thirty-second session (4-8 May 1998) to continue their work and requested the secretariat to undertake additional statistical work to support their efforts.

Notes

[1] "Vulnerability Index: Revised Background Paper", prepared by the United Nations Department of Economic and Social Affairs, June 1997.

[2] Professors Lino Briguglio and Dennis Pantin.

[3] *Official Records of the Economic and Social Council, 1997, Supplement No. 15* (E/1997/35).

Annex

Report of the ad hoc expert group meeting on vulnerability indices for small island developing States

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I. Introduction

1. The expert group reviewed a number of studies on the vulnerability issue, including studies specifically prepared for the meeting and studies prepared for other meetings. Brief summaries of the major reports, as agreed by the expert group, are given in section II of the present report and its conclusions and recommendations are contained in section III.

II. Highlights of major reports reviewed

A. Alternative economic vulnerability indices

2. The study by L. Briguglio[a] examined the conceptual relevance and effectiveness of a number of indicators in capturing long-term economic vulnerability of countries. Those indicators were:

(a) Economic exposure index based on trade openness: exports plus imports of goods and services as a percentage of gross domestic product (GDP);

(b) Export concentration index: percentage of three highest export categories in total exports of goods and services, or export diversification index of the United Nations Conference on Trade and Development (UNCTAD);

(c) Peripherality: percentage of freight and insurance debits relative to total merchandise imports, or the cost, insurance, freight/free on board (c.i.f./f.o.b.) factor expressed as a percentage;

(d) Dependence on imported commercial energy: imports of commercial energy expressed as a percentage of imports plus production of commercial energy, or imports of fuel as a percentage to gross national product (GNP);

(e) Dependence on foreign sources of finance: remittances, capital and financial inflows as a percentage of GNP, or total external debt as a percentage of GNP.

3. The selection of those indicators was based on the general observation that the higher their value in a given country, the higher the susceptibility of the country to external shocks. All the indicators were individually assessed for their respective suitability in terms of their effectiveness in capturing the underlying causes of long-term vulnerability.

4. A total of 19 composite indices combining different sets of the indicators were reviewed. The exercise was done for a maximum of 111 countries, including 30 small island developing States. The results generally indicated that small islands were among the most vulnerable developing countries.

B. Measurement of the vulnerability of small States

5. The study by R. Chander[b] used the basic methodology employed by L. Briguglio, but an alternative set of variables. The following four basic variables were used in the computation of a composite vulnerability index:

(a) The ratio of exports of goods and services to GDP, to capture the dependence on external markets;

(b) Export concentration, to highlight dependence on a narrow range of products;

(c) The ratio of long-term capital flows to gross domestic investment to reflect dependence on external funds to finance development;

(d) The ratio of imports at c.i.f. and f.o.b. values, as a measure of costs associated with remoteness and insularity.

The variables were standardized and equal weights assigned to them in the computation of the composite vulnerability index, which confirmed that small island developing States were generally more vulnerable than larger countries. The study also confirmed that countries which had a diversified export and production base were less vulnerable, and emphasized that further refinements of a composite vulnerability index would need to await data refinements and improvements.

C. Composite vulnerability index: a revised report

6. The main objective of the Commonwealth Secretariat's work on vulnerability indices for small States is to demonstrate that these countries are more vulnerable than large countries because of the instability of their income, despite relatively high per capita incomes.

7. The empirical analysis done by the Secretariat[c] suggested that, although the trend growth rates of small economies were not different from large States, they were more vulnerable to external shocks. The heightened vulnerability was manifest in a higher volatility of output of

small States compared with large countries. Therefore, volatility of output was used as the underlying principle in the construction of the composite vulnerability index.

8. The factors contributing to output volatility were identified using multiple regression analysis. This analysis suggested three important reasons for greater volatility of small States' GDP, namely, instability of purchasing power of exports in terms of imports (i.e. net income terms of trade); instability of capital inflows relative to GDP; and vulnerability to natural disasters. Three vital elements which capture these influences were selected on the basis of correlation analysis for inclusion in the composite index, namely, export diversification, capital openness, and vulnerability to natural disasters estimated as the percentage of population affected by natural disasters. These three variables, together with per capita GDP, constituted the components of the composite index. By and large, the index values suggested that small States are more vulnerable than large countries.

D. Alternative ecological vulnerability indices

9. In the study by D. Pantin,[d] ecological vulnerability indices are meant to capture the relative susceptibility of economies to damage caused by natural disasters and the relative susceptibility of the ecology of countries to damage by anthropogenic activities. A comprehensive assessment of ecological vulnerability either in terms of countries or indicators, was not possible owing to constraints posed by insufficient data.

10. On the basis of the available data, the expert group examined the impact of natural disasters on a number of economic indicators, such as exports, imports, consumer price indices and external debt. The exercise was done for two sets of developing countries. One set comprised 83 countries, including 27 small island developing States, and the other comprised 58 countries, including 18 small island developing States. The countries were grouped into three categories: small island developing States, other islands and non-islands. The exercise revealed that small island developing States as a group are the most seriously affected in relation to the indicators used.

11. The expert group also examined the impact of natural disasters on the population and susceptibility to ecological damage in terms of length of coastline to total land area, and area of cropland to total land area, on the basis of the available data. In each case, the group of small island developing States included in the exercise was found to be the most vulnerable.

E. Vulnerability of small island developing States in the context of globalization

12. The UNCTAD paper[e] sets out criteria and factors of island-specific vulnerability that should be taken into consideration if one wishes to assess the economic viability of islands. It stresses that such analysis is important to enable policy makers to deal with the vulnerability faced by individual island countries, with a view to preventing marginalization of the islands in the globalizing economy. The paper considers the main types of external shocks with which the notion of vulnerability is associated in the context of globalization, as well as different levels of criteria of vulnerability (economic performance, economic structure, intrinsic factors of economic structure).

13. Overall, the paper demonstrates that, by analysing island vulnerability among small island developing States through the aforementioned factors, it is possible (a) to highlight important, common elements of vulnerability, either among virtually all small island developing States or within sub-groups of them; and (b) to provide a useful basis for analysing the fragility of any individual island country and designing appropriate policies for improving its economic structure and alleviating its vulnerability. The benchmark of the paper is the notion of economic specialization, which is the sphere of analysis that should be focused on if one aims at reducing island vulnerability. There are great advantages to analysing the potential of some small island developing States in the light of the success or difficulties met by other small island developing States.

III. Conclusions and recommendations

14. The expert group agreed that vulnerability indices are meant to reflect relative economic and ecological susceptibility to exogenous shocks, that is to say, the risk of a country being affected by such shocks. The vulnerability index is designed to identify which group of countries exceed a threshold of vulnerability at which they are particularly susceptible to risks and warrant special attention from agencies providing assistance. At the same time, the index and its components are intended to provide a multidimensional approach to the identification of programmes designed to reduce the exposure of individual countries to exogenous factors that may affect their

development. The group concurred that vulnerability indices should be simple to build and based on indicators that are easy to comprehend and intuitively meaningful, and suitable for inter-country comparisons or reflecting relative vulnerability of small island developing States and non-small island developing States.

15. Judging from the results of a number of studies using a diversity of approaches, in particular, two reports of the Commonwealth Secretariat, the report of UNCTAD and the reports of consultants that were submitted to the meeting, the group concluded that:

(a) As a group small island developing States are more vulnerable than other groups of developing countries;

(b) The vulnerability referred to is structural vulnerability that depends on factors which are not under the control of national authorities when the shocks occur; the indicators should reflect exposure to shocks, that is to say, their magnitude and their probability;

(c) A large number of possible indicators of vulnerability can be conceived, but only those consistent with the above definition of vulnerability should be used; some structural handicaps cannot be considered as vulnerability;

(d) Not all potentially relevant indicators can at present be meaningfully included in a composite vulnerability index because of constraints imposed by insufficient data, the difficulty of quantifying some indicators, and the need for simplicity.

16. The expert group examined the conceptual relevance and feasibility of a number of indicators in reflecting structural economic and ecological vulnerability of countries. With regard to ecological vulnerability, the group agreed that indices should reflect the relative susceptibility of economies to damage caused by natural disasters and relative susceptibility of the ecology of countries to damage caused by anthropogenic activities or exogenous factors. The former should reflect economic vulnerability induced by the environment and the latter, ecological vulnerability.

17. On the basis of the available data, the expert group examined the impact of natural disasters on a number of economic indicators and concluded that it would be useful and feasible to consider the frequency of occurrence of natural disasters weighted by the percentage of the population affected.

18. While the group recognized that an index of human and economic loss due to natural disasters had been recommended to the United Nations Commission on Sustainable Development in August 1996, it felt that, at this stage, such a broad index would not be operationally feasible. The group suggested that efforts should continue to undertake systematic assessments of the economic impact of natural disasters which could eventually be used for this purpose.

19. Concerning other components of an economic vulnerability index, exposure to trade shocks was extensively discussed. It was agreed that openness to trade (or any indicator based on trade/GDP ratio) should not be considered per se as an indicator of vulnerability, but that it could be considered as a weighting factor for measuring the exposure to risk incurred by a country. The risk could be proxied by a concentration coefficient of exports of goods and services, and then possibly weighted or multiplied by an export/GDP ratio. For instance, the indicator could be the ratio of the three leading exports of goods and services to GDP taken as an average for a number of years. This indicator could be complemented by an index of instability of the exports of goods and services. Remittances could be added to the value of goods and services.

20. It was suggested that, in its future work, UNCTAD might consider the feasibility of including services in the computation of the concentration index, as this would increase its relevance to small island developing States and other developing countries.

21. The group expressed concern at the lack of data needed to compute variables relevant to economic vulnerability for many small island developing States, and recommended that emphasis be given to filling those data gaps.

22. It was not possible to build a composite index of ecological fragility, i.e. vulnerability of the ecosystem, to anthropogenic activities or exogenous factors. It was proposed, however, that work continue on the building of such an index, taking into account a number of factors, such as biodiversity, climate change and sea-level rise and exposure to oil spills.

23. As far as the vulnerability of small island developing States is concerned, it was suggested that a set of data, including time-series data for the separate indicators, should be collected for each country – and specifically requested when data are missing – in order to design a vulnerability profile covering both economic and ecological aspects.

24. The expert group noted that many small island developing States faced vulnerability related to social and cultural diversity, and suggested that further studies were needed. The group suggested that for the time being, qualitative work in this area should continue.

25. Finally the group considered that other groups or bodies, such as the Committee for Development Planning, drawing on a broad list of indicators such as those included in the reports prepared for the meeting, could build specific composite vulnerability indices based on the two or three indicators which are most significant for their purposes, for example for identification of least developed countries.

IV. Organization of the meeting

26. The ad hoc expert group on vulnerability indices, comprising 22 participants and 17 observers, met at United Nations Headquarters, on 15 and 16 December 1997. The list of participants and observers is contained in the appendix to the present report.

The officers elected for the meeting were:

Chairman:	Patrick Guillaumont
Co-Chairman/Rapporteur:	Bishnodat Persaud

27. The meeting was opened by the Under-Secretary-General for the Department of Economic and Social Affairs, Mr. Nitin Desai, who welcomed the attendees and made a statement. In his statement, Mr. Desai recalled that the idea of vulnerability went back to the United Nations Conference on Environment and Development. He said that the main task of the expert group was to make a professional assessment of vulnerability and, on the basis of their deliberations, to make recommendations on the quantitative parameters underlying relative vulnerability of countries.

28. In a keynote statement, the Permanent Representative of Samoa, Mr. T. N. Slade, spoke of the shortcomings of the indicators currently used for determining the true social and economic strength of small island developing States. He expressed the need for a full and proper understanding of vulnerability based on a technical assessment of the specific variables suitable for building vulnerability indices, which was necessary in order for small island developing States to plan for and seek from the international community vital support for their efforts at sustainable development.

29. Substantive services for the meeting were provided by the Department of Economic and Social Affairs.

Notes

[a] "Alternative Economic Vulnerability Indices for Developing Countries". Report prepared by Lino Briguglio, Professor of Economics at the University of Malta, for the United Nations Department of Economic and Social Affairs, December 1997.

[b] "Measurement of the Vulnerability of Small States". Report prepared by Datuk Ramesh Chander for the Commonwealth Secretariat, April 1996.

[c] "Composite Vulnerability Index: A Revised Report". Prepared for the Commonwealth Secretariat by Dr. John Wells, Faculty of Economics and Politics, University of Cambridge, August 1997.

[d] "Alternative Ecological Vulnerability Indices for Developing Countries with Special Reference to Small Island Developing States (SIDS)". Report prepared by Dennis Pantin, Senior Lecturer and Head of the Economics Department of the University of the West Indies at St. Augustine Campus, for the United Nations Department of Economic and Social Affairs, December 1997.

[e] "The Vulnerability of Small Island Developing States in the Context of Globalization: Common Issues and Remedies". Discussion paper prepared by the United Nations Conference on Trade and Development, December 1997.

Appendix

List of participants/observers

Participants

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